

Space Weather Forecast

Issued on Monday, 18 April 2022 at 13:08 Local

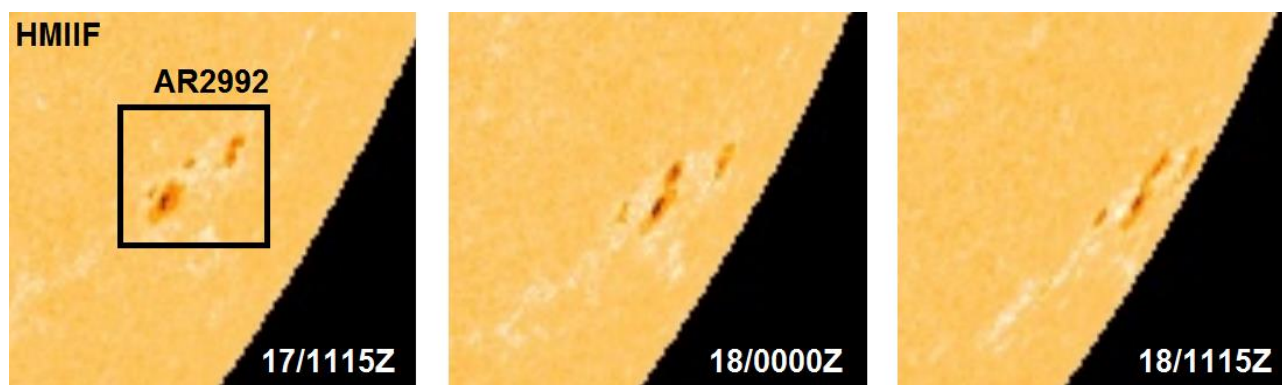
This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Moderate-class flares Likely throughout (R1/R2 Radio Blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was moderate over the past 24 hours, with the sputtering into life of a southwestern quadrant sunspot generating frequent common-class and occasional moderate-class flares, peaking with at 17/2334UTC. The precise classification of this growing sunspot region is open to doubt given its approach to the western horizon, however it appears to be magnetically bipolar and growing at the time of writing. The emergence of this group as the most potent was probably down to its growth trend, as the facing side of the sun remains dominated areally and in terms of magnetic complexity by a large pair of spots occupying the northeastern portion of the sun, with one of these also producing some smaller moderate-class activity.

Figure 1: Time sequence in visible imagery of evolution of the southwestern sunspot group over the past 24 hours. Note that detail is becoming increasingly difficult to discern, but there appears to be interaction between the two intermediate spots, which are of opposing magnetic polarity.



There were otherwise up to three other sunspot groups on the sun, bringing the total to six, although these were all stable and unproductive in the period.

A 'filament eruption' (arc of plasma leaving the sun) was observed in the southwestern quarter of the sun in the immediate vicinity of the destabilising influence of the flaring sunspot group at 17/1600UTC. Analysis is still underway for this event, however an Earth-directed component appears unlikely for the parameters submitted for modelling. Other Coronal Mass Ejections (CMEs) visible on imagery appear to be low-latitude far-sided features, with no effect at Earth therefore expected.

Solar Wind / Geomagnetic Activity: The solar wind showed the characteristics of a fast wind regime, perhaps also signalling a transition between the responsible 'coronal holes' in the early
Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

evening UTC as the speed underwent a resurgence. The number of particles comprising the solar wind otherwise rose and fell at slightly elevated levels, with the magnetic field acting in a similar fashion, with both returning to normal background after the possible change in fast wind sources was complete.

The net effect of the above solar wind measures was provisionally quiet throughout, well below Minor Geomagnetic Storm G1.

Energetic Particles / Solar Radiation: No solar radiation storms were observed in the period, despite a series of sizeable, mainly western solar hemisphere flares.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is likely to be moderate through the period, with a daily slight chance of strong-class flares. The recently active southwestern sunspot's departure in 24 hours ought to be compensated for by the current northeastern quarter of the sun and perhaps also by returning large regions over the northeastern horizon, giving a flat trend over the four days.

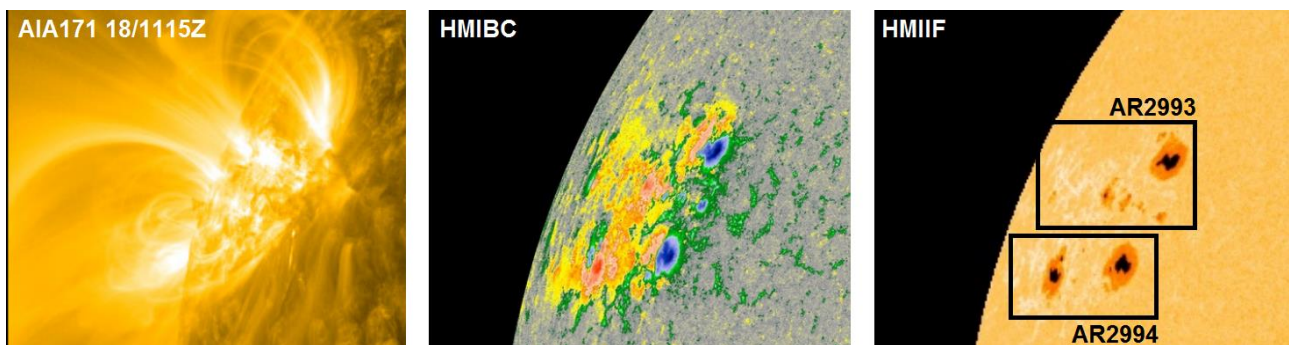


Figure 2: View of the northeastern limb sunspot cluster in (left) extreme UV, a proxy for magnetic field lines; (middle) magnetic imagery; (right) visible imagery.

Solar Wind / Geomagnetic Activity: There are no Earth-directed CMEs in the current forecast. There are up to three 'coronal holes' due in the four days, with a transition between the first of these perhaps already having occurred. This leaves a final onset as due later Wednesday 20 April. While mainly quiet, there is according 5% slight chance of Minor Storm G1 for most days of the period, with Tuesday 19 April perhaps most reliably quiet.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, but the daily probability should show a rising slight chance of S1 or greater in the four days, the result of westward progression of the largest spots.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	5	1	5	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	Yes	75	75	75	75
Very Active	R3 to R5 X	No	20	20	20	20

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	5	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)